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ABSTRACT

Kent State University (Ohio) Regional Campuses have conducted surveys of their applied business associate degree graduates in office management, accounting, business management, and their employers. Responses indicated the need for computer literacy appropriate to the employment situation. In addition, instructors of traditional liberal arts subjects are requiring students to access and use computerized databases. The recognition that the technology has forged an interdependency between disciplines impacts the curricula of specific disciplines, as well as the traditional perspective and content of an introductory course in computers. Two figures present proportions of hardware types and proportions of software applications used by accounting, business management, and office management graduate respondents. (AEF)

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COMPUTERS ACROSS THE CURRICULUM: Teaching A Computer Literacy Course for Multi-disciplinary Use in a Network Environment - Content and Pedagogy

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Abstract

Kent State University Regional Campuses has conducted surveys of their applied business associate degree graduates in Office Management, Accounting, Business Management, and their employers. The response to these survey's consistently indicated the need for computer literacy appropriate to the employment situation. In addition, instructors of traditional liberal arts subjects are requiring students to access and use computerized databases. The recognition that the technology has forged an interdependency between disciplines impacts no only the curricula of specific disciplines, but also the traditional perspective and content of an introductory course in computers as taught by computer faculty.

Introduction

Our society is on the brink of a remarkable transformation. As the force behind this social evolution, the information technologies enable "tabletop" access to humanity's accumulated body of knowledge. Computer "expertise" is no longer the domain of a select few practitioners who perform rites of processing in cryptic languages, for a child can lead the way.

The recognition of the public ownership of information through the use of computer- integrated technologies has lead to a new economic paradigm inclusive of government, business/industry, secondary education, and higher education. Institutions of higher education play the pivotal role in the success of this consortium for "virtually every significant advance in knowledge and new technology originates with college-educated people . . . the leaders in almost every walk of life are college-educated" (Riley Report, 1993). In addition, current and future employment opportunities will have high information content, demanding higher order thinking skills in order to make effective and efficient decisions formerly reserved for a chain-of-command. Therefore, higher education is facing the challenge of adapting to the needs of the marketplace and addressing the cultural diversity of a high-tech knowledge based society.

The Challenge

The social ideological landscape upon which institutions of higher education are built is rapidly changing. This evolving terrain is inclusive of: budgetary constraints, having to more with less;

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accountability, this includes performance measures supported by documentation prepared for oversight agencies or organizations, responsibility to business and industry who rely on the higher education system for an educated workforce, and the promise of knowledge the students who have entrusted their future to the system; and technological intervention into the classroom and office - changing the way in which education is delivered.

This trinity is not mutually exclusive. However, the information technologies are the power tools in transformation of higher education as a system. The challenge that we face as educators is not to be threatened by the change, rather there must be a willingness and desire to take advantage of the situation; to lead - not follow - the reformation.

Third Wave Preparedness

How prepared is higher education? A recent survey by the American Electronics Association's National Information Infrastructure Task Force found "that just 59 per cent of the teachers surveyed said they had access to multimedia computers, 29 per cent had networked computers, and 20 per cent had an Internet connection" (Chronicle of Higher Education 3/31/95, pg. A19). As alarming as these figures are, they only address accessibility, not use. In addition, there is a technological gap both inter and intra institutional which has produced a new class of have's and have not's.

The Have's

Skimming over the journals or surfing the Internet quickly reveals who has caught the wave. Both commercial vendors and institutions of higher education are utilizing the Internet to alter the way in which knowledge in transmitted. The Gopher and WWW sites are an electronic windows of insight into an institutions understanding of the application of the technology. Some of these can be accessed on the Web at:

http://www.portal.com/~webacad/
http:/www.iftech.com/
http:/www.iftech.com/iti/othertut.htm
http://www.yahoo.com/education/courses

Therefore, extant in the ether are examples of the technology being merely used an overlay of the traditional, to the creating of a new template of communicating, teaching, and learning.

A holistic prototype of internet innovation is BEV. The Blacksburg Electronic Village is a Gopher and WWW (http://crusher.bev.net/), site which is a cooperative project of Virginia Tech, Bell Atlantic of Virginia, and the Town of Blacksburg, Virginia. As an existing illustration of how the new paradigm can succeed, BEV has the capability to involve all of their citizens in the information revolution. However, for the citizens of Blacksburg, or any community, to utilize this resource to its potential, education should precede access.

Kent State University Regional Campuses

The Kent State University Regional Campus System is comprised of seven regional campuses located in six northeastern Ohio counties. These commuter campuses serve both the traditional and

non-traditional student, and offer a wide array of associate degree programs, transfer and parallel courses, limited upper division, and graduate coursework. Under the administrative leadership of Dr. Gordon W. Keller, Vice Provost for Regional Campuses, the system has moved to the brink of becoming a full-fledged member of the Internet community.

Each campus in the system has a unique repertoire of hardware and software specific to their needs. The Trumbull Campus computing manifest is dynamic, currently consisting of four dedicated file servers running Novell and UNIX. These LAN's support nearly 300 workstations for administrative and academic needs. It is anticipated that by the fall of 1995, the Trumbull Campus will become a WWW site.

The Computer Curriculum

The Internet capability, coupled with the fact that various non-computing disciplines are using various facets of the system for instructional support, forewarns a fundamental change in classroom pedagogy and student performance expectation. This shift directly impacts upon the computer faculty, program goals, mission, and associated curriculum.

Because of the overwhelming variety and the rapid revision of software(s), computer faculty can develop expertise only in limited subject areas. This presents computer faculty with a conundrum. Not only must they focus on software specialization within their degree programs, but also broaden their perspective to include computer application within the curricula of other disciplines. Computer-related technologies have forged an interdependency between disciplines and computer literate faculty must take an active part in the formulation and presentation of coursework in support of other degree programs.

Computers Across The Curriculum

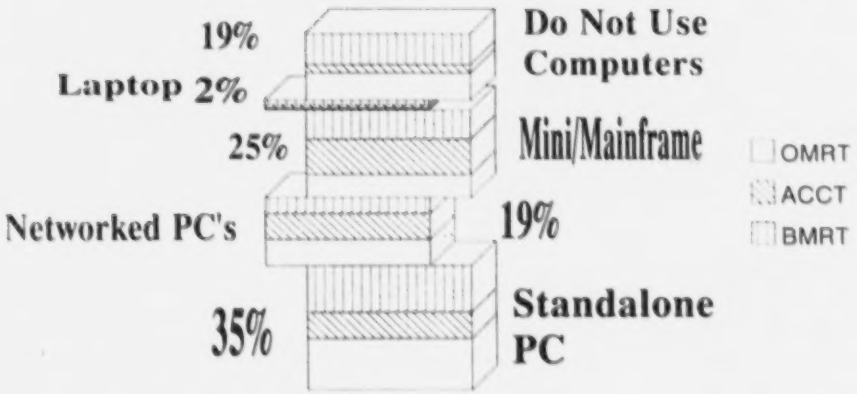
At the Trumbull Campus, English faculty are requiring term papers be composed using word processors. At present, the majority of students taking the freshman course have no computer skills and the English faculty are taking time away from their course content to provide computer instruction. Although admirable, the knowledge conveyed to the students regarding what a computer is confined to the individual instructor's (mis)understanding. Currently, WordStar and three different versions of WordPerfect are taught to students in English classes. In some instances, the instructor insists that the student uses the software which is familiar to the instructor regardless of the students personal knowledge.

Other disciplines also require computer skills. A Geography instructor requires that research for term papers be conducted using the telecommunication links to the electronic library databases. Again, time is taken away from the course content in order to train students in a single use of the Internet revolution. Nursing, Psychology, and Philosophy students have available computer-based study aids. The Office Management curriculum does not require an introductory course in computers, but does require a spreadsheet course which is taught exclusively by their faculty. Banking and Business Management coursework include spreadsheet components which require the instructor to first teach the basics before utilization and comprehension can be effective.

The occurrence of these and other examples of computer usage in the classroom make it abundantly clear that a computer literacy course must become part of the general requirements for all degree programs. While this has not yet occurred, the computer faculty, both individually and collectively, are moving towards a restructuring of the traditional introduction to computer course. The composition of this course(s) is guided, in part, by the surveys of the regional campuses graduates and their employers which were individually conducted by the Accounting, Business Management, and Office Management programs.

The compilation of computer-related data provided by these independent surveys demonstrates a pattern of consistency regarding both the hardware and software utilized. Figure 1., shows the hardware employed by the graduate respondents in their current position. As noted, eighty one percent (81%) of the graduate respondents from these three program utilize a computer in their employment situation. Fifty four percent (54%) of this usage is in a PC environment.

Proportions of Hardware Types Used by Accounting, Business Management, and Office Management Graduate Respondents

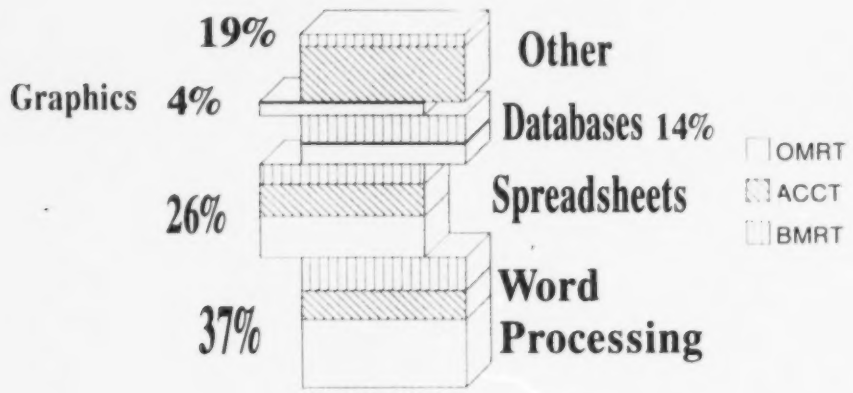


Total Responses (N=219)

Figure 1.

Figure 2., represents the proportion of software applications utilized by the graduate respondents. Overall, the big three of general software application are dominate representing seventy seven percent (77%) of computer usage.

Proportions of Applications Used by Accounting, Business Management, and Office Management Graduate Respondents



Total Responses (N=231)

Figure 2.

A cautionary note must be added, these surveys represent respondents who variously graduated between 1986 - 1992. Queries regarding Internet use were not considered when the survey tools were constructed. The rapid change in the computer industry may also reflect an increase in the number of PC's and laptop's in use.

Taking into consideration the above usages and needs, the overall objective of a computer literacy course is student success. Students need to both enjoy and understand a computer system through a combination of theory and application.

Computer Literacy: Content And Pedagogy

The prediction of a computer on every desktop and in every home made over a decade ago seems finally to be upon us. Now computer faculty are faced with students who not only drive a better car than they do, but also own a better computer. Facetiousness aside, currently over fifty percent (50%) of the students in a introductory course have no experience using a computer. Of those that do, knowledge is limited being a user of a packaged program. Only a few have knowledge of a computer system, which generally has been gained by trial-and-error or by trying to decipher manuals. Therefore, this first computer course should be conducted as if the student has no previous knowledge or experience on a computer system.

At present, the introductory course is 3 semester credit hours. Internally the course is designated as 2 hours of lecture, and 1 hour of lab (3.5 teaching load) representing one and a half real time class hours twice a week. The regional campuses computer technology agree in general that the following topics should comprise the generalized computer literacy course:

hardware/software terminology and general concepts
operating systems (DOS and Windows)
networking and communications concepts
e-mail, internet, world wide web
word processing (windows based)
computer ethics
issues regarding buying a PC

Textbook selections are individualized, with some faculty opting for none. I use O'Leary & O'Leary's Computer Essentials: Annual Edition, available from McGraw-Hill (ISBN: 0-07- 048984-X or 1-800-338-3987). I choose this text because it is relatively inexpensive, easy to understand, and compliments the course content and my teaching style.

From my perspective, within the first several classes, an instructor should accomplish two parallel concepts. First, I have found that students do not know or really understand the process of problem-solving. Humans have had the same intellectual capacity for over 50,000 years and the concept of a computer is not new. Other than the traditional example of the abacus, there are the Mesolithic cave-paintings and tally stones, monumental calculators like Stonehenge, the Mayan calendar round, and a wooden Stonehenge-like structure excavated at Cahokia, an archaeological site in the Mississippian floodplain near Alton, Illinois. All of these are cognitive tools created utilizing state-of-the-art technology. A modern computer is a cognitive tool created by humans in their own image using the state-of-the-art technology. Focus of lecture is not on the computer, but on the process (semantics) of human problem- solving.

Second, that computers do not think. They only appear to think because they reflect the human cognitive process (a magicians ruse). The full implication of WYSIWYG (what you see is what you get) should be ingrained ASAP (not a computer abbreviation or acronym).

A problem-solving exercise that I have found useful in linking these concepts together is GUM. I tell the class that they will solve a problem where the result is chewing gum. I then take an unopened pack of stick gum from my pocket and tell them to instruct me in how to chew the gum. I write their instructions on the board in a pseudocode, forcing the students to specify consistent operators and operands (an instruction such as "pick up the gum" is too vague). It generally takes thirty to forty minutes to open and chew the gum. Within this time it is hoped students will comprehend the syntactic and semantic complexity of what they at first considered a simple task. I point out the pattern of repetitive operations, the progressive result of properly sequenced operations, and the value of various logic structures such as a Do Until (the flavor is gone).

While these concepts are being explained, the purely mechanical operation of a computer system can be performed. Ideally, lecture and lab are taught in an electronic classroom with networked PC's. The instructor's station is interfaced with a projection unit. With this configuration available the instructor can lecture in the traditional manner, lecture and demonstrate (show and tell), while having the class mimic examples on their own PC, or conduct lab where the students are working independently.

Location of keys and mouse dexterity are points of tremendous frustration. Confidence in the mechanical operation of the computer system can be achieved through non- threatening exercises. I have found that letting the students play games readily instills these skills.

Evaluation of student performance is evenly divided between written exams and lab projects. This split provides the opportunity for students to experience and excel using an alternative learning style. Using this technique, overall class performance has increased.

The lab projects are designed to be fun. The first project is for the student to produce a drawing using the Paintbrush utility in Windows. Again, situated in a non- threatening environment, the student refines manual dexterity skills, begins to understand the semantic connection between sequential action and cumulative results, and learns the commonality of menu screens as they relate to working within a Windows environment.

Another project teaches the use of word processing in both a DOS and Windows environment. I use two versions of WordPerfect to: 1) show the difference between versions in terms of a software upgrade, and 2) demonstrate the transferability of data to a higher version, but not down again. In addition, once the students have a word processing skill, they are required to import other projects into the WP environment (ASCII files, .BMP, .CGM, etc).

The largest single topic time block is spent on connectivity. Over the course of a fifteen week semester, fully one third may be devoted to the many facets of Internet communication. Major areas demonstrated and then reenforced through projects include: e- mail, links to library databases, BC Gopher, NCSA Mosaic, and NetScape.

Exercises in the use of e-mail include sending mail to me, and in collaboration with my colleagues at other regional campuses, transmitting to students in their classes. Exercises in the use of library databases require that students provide me with a hardcopy of resources located at the Kent library (KentLink), a library elsewhere in Ohio (OhioLink), and one from an out-of-state library (WorldCat). Internet exercises include accessing the MERIT software library and downloading files for both DOS and Windows. I have them copy .zip files, unpack and execute their finds (usually games). Guides to the internet are also popular items for a download.

Since abbreviations and acronyms abound throughout the Internet and within the computer industry in general, I supply each student with a copy of BABEL, a glossary of computer terms complied by Irving Kind. Although under copyright, specified reproduction is allowed. A copy of this useful reference can be found at:

http://www.access.digex.net/~ikind/babel95a.html

If times permits, I also show what other Window browsers are available that are not resident on our system (WinTapestry has a demo). These can be accessed through City Net Express:

http://www.city.net/checkup.cgi

http://www.city.net/

There is more covered in the course in terms of lecture than space (or perhaps interest) allows here. There is also more to be covered than the time allotted for a single course can permit. Therefore, it is the conclusion of the regional campuses computer faculty that a sequence of two courses are necessary in order meet the computer needs of other disciplines.

Discussions of the content for this second course center on the following topics:

Spreadsheets (windows based)
Database software (windows based)
Multi-media
Advanced Internet surfing (research project)

Introduction (brief) to programming concepts with a visual programming tool Integration of data within software suites in Windows via OLE or current standard

As a group, we are open to any and all suggestions regarding these crucial courses. Please e-mail your thoughts to me at the above e-mail address or to Dr. Larry D. Jones, Interim Director, School of Technology, Kent State University (jonesl@aldebaren.win.net).

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